Case Report

Proximal fibular osteochondroma causing splitting of common peroneal nerve leading to neuropathy in an adult – a rare case report

Wankhade U. G[1], Amit R. Kale[2], Rawate P[3], Bathala G[4]

[1]Dr. Ujjwal G. Wankhade, Registrar, [2]Dr. Amit Kale, Associate Professor, [3]Dr. Prafful Rawate, Assistant Professor, [4]Dr. Gaurav Bathala, Resident, all authors are affiliated with Department of Orthopaedics, Byramjee Jeejeebhoy Government Medical College and Sassoon General Hospital, Pune, Maharashtra, India.

Address of Correspondence- Dr. Ujwal G. Wankhade, B-2/993, Tirupati Apartments, Pudumjee Park Lane 2, Pamnani Path, Nana Peth, Near Quarter Gate, Pune, Maharashtra, India. Email address- drujjwalwankhadeortho@gmail.com.

Abstract

Osteochondroma is the most common benign primary tumor of appendicular skeleton arising from the metaphyseal or metadiaphyseal region of long bones and are most commonly seen around the knee. A proximal fibular osteochondroma may distort the normal anatomical course of nerves and it may lead to vascular compression syndromes or peroneal nerve paralysis. We report a case of proximal fibular osteochondroma causing splitting of common peroneal nerve leading to neuropathy in an adult. Our article concludes that osteochondroma of proximal fibula could be responsible for common peroneal nerve palsy due to compression or entrapment and in such cases decompression of nerve should not be delayed. Moreover, we also report that osteochondroma causing splitting of midsubstance of common peroneal nerve which may surprise surgeon intraoperatively. Through this case report, we are hoping to alert surgeons that this problem may occur, and care should be taken to identify the entire common peroneal nerve prior to removal of the osteochondroma.

Keywords: Osteochondroma, Excision, Common peroneal nerve, Compressive neuropathy.

Introduction

Most common benign tumor of the skeleton is undoubtedly osteochondroma. It usually arises from the metaphyseal or metadiaphyseal zones of long bones of the appendicular skeleton and are most commonly seen around the knee. Osteochondromas grow during childhood through adolescence, but usually growing ends when the epiphyseal plates close. Usually, osteochondromas are common among patients younger than 20 years-old and extensive osteochondroma growth into adulthood is rarely reported [1]

Fibular tumors comprise 2.5% of total primary bone tumors. The most common tumors around fibular head are osteochondroma, giant cell tumor, Ewing's sarcoma, osteosarcoma.Eccentric growth of the osteochondromas due to solitary osteochondroma or hereditary multiple exostoses may trigger variety of symptoms. Osteochondromas of proximal fibula due to their close location to the neurovascular bundle can cause compressive neuropathy of the peroneal nerve. A proximal fibular osteochondroma may alter the normal anatomical course of nerves and it may lead to vascular compression syndromes or peroneal nerve paralysis [2]. Here, we are reporting a rare case of proximal fibular osteochondroma in a 23 years old female causing common peroneal nerve midsubstance splitting leading to neuropathy which was treated surgically by excision of osteochondroma.

Case Report

A 23 year old female was referred to our outpatient department with complains of tingling and numbness in her left foot and inability to dorsiflex her left foot since last six months which was accompanied with radiating pain to left foot. Radiating pain and numbness in her left foot was gradual in onset, dull aching in nature, aggravated by knee movement

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which has enhanced since last six months to incapacitate her to bed and character of pain turned into sharp shooting type. Pain was located below left knee radiating to foot. There was no history of trauma or low backache in patient.

On clinical examination, patient had a bony swelling of size 4 × 4 cms arising from anterolateral aspect of left proximal fibula. The swelling was irregular, hard, non-tender and fixed to bone. No other bony swelling was identified anywhere else. The movement in the knee joint was not restricted and Tinel's sign was positive with percussion in this area. Neurological examination revealed paresis of the tibialis anticus, lateral peroneal, and extensor digitorum muscles with a muscle strength grade of 4/5. No sensory loss was present in the affected leg. Plain radiographs (AP and lateral view) of leg with knee were taken, which revealed a small peduncalated bony growth arising from proximal fibula away from knee joint [**Figure1**]. Electrophysiological studies confirmed denervation of the muscles supplied by the left peroneal nerve, which suggested impairment of this nerve at the level of the fibular head. Provisional diagnosis of Solitary peduncalated osteochondroma causing compression neuropathy was made.

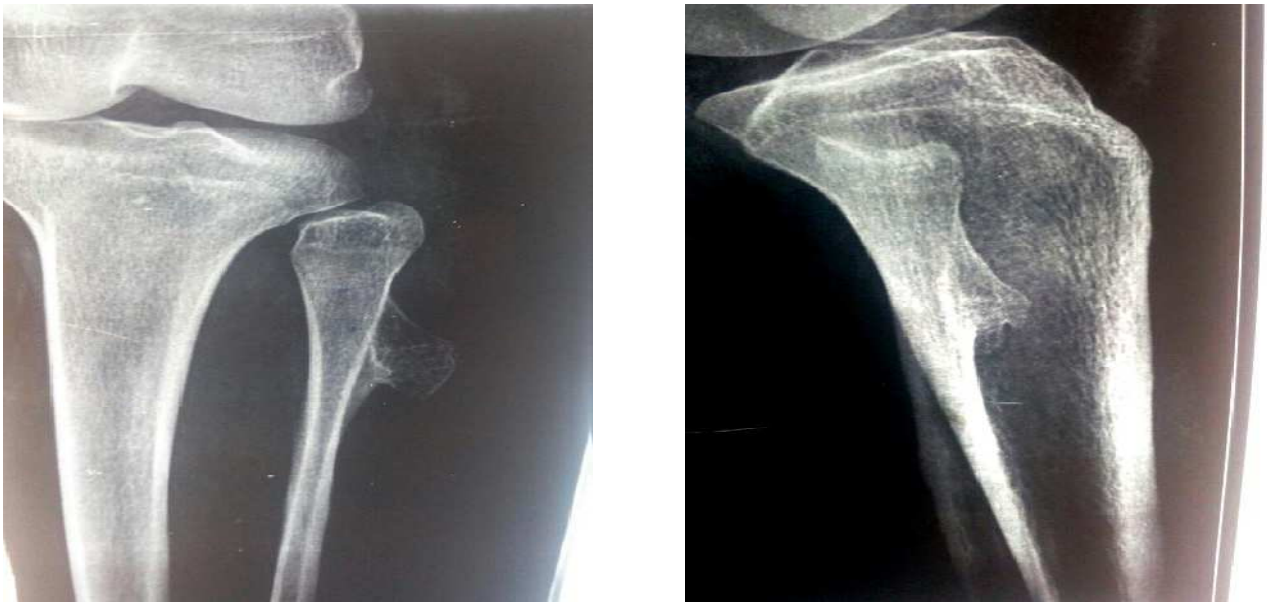

Figure-1: Anteroposterior and Lateral view of Proximal fibula showing Peduncalated Osteochondroma

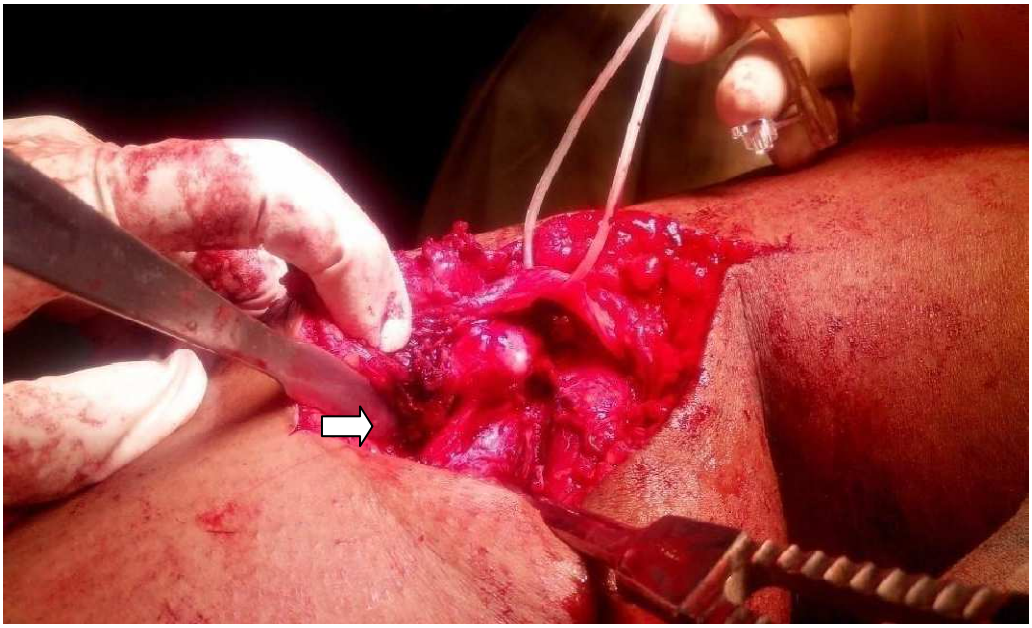

Figure 2: Osteochondroma growing through Common peroneal nerve being isolated.
(Arrow indicating cephalad end of hindlimb)

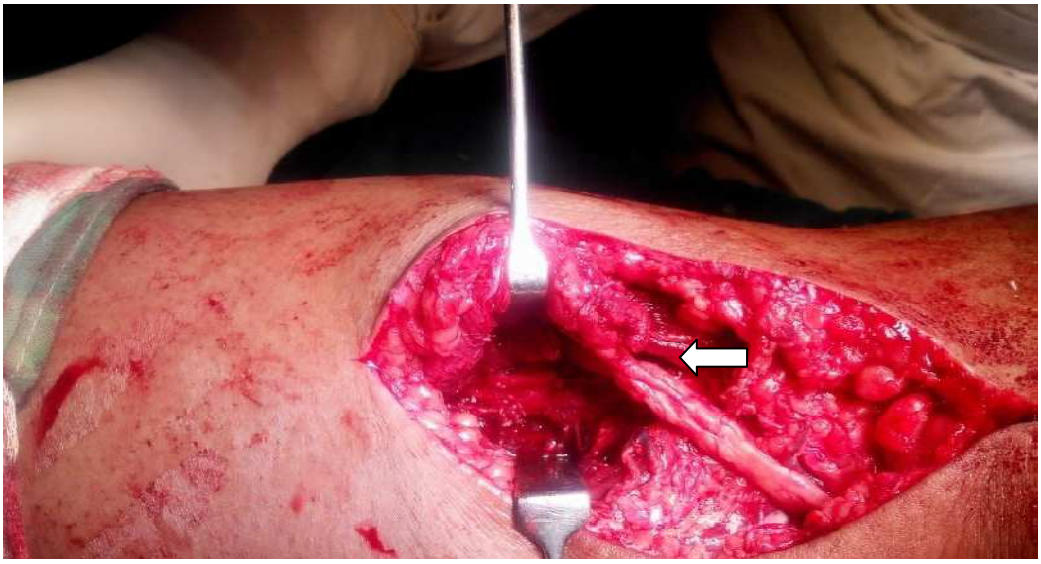

Figure-3: Common peroneal nerve decompressed after excision of Osteochondroma through base of tumour. (Arrow indicating Cephalad end of hindlimb)

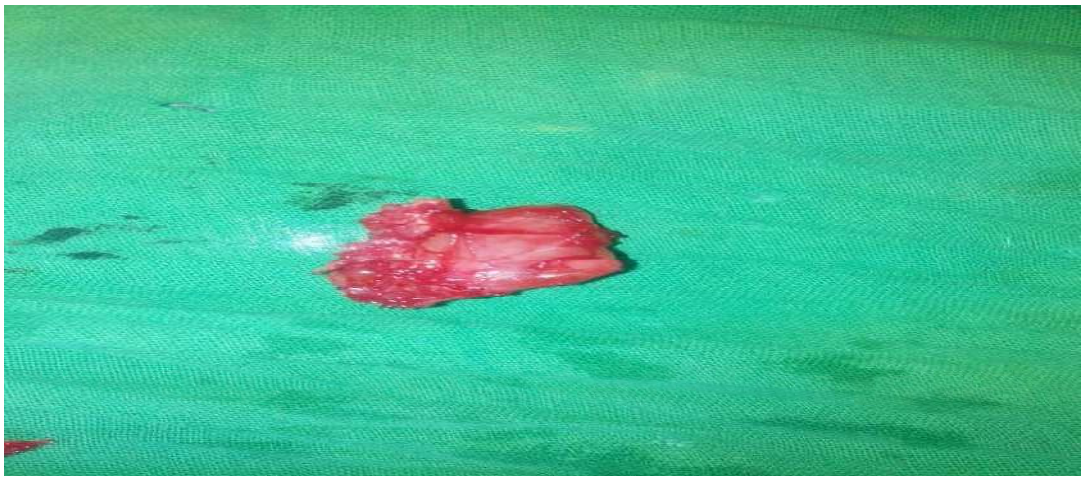

Figure-4: - Gross specimen of Osteochondroma with intact cartilage cap

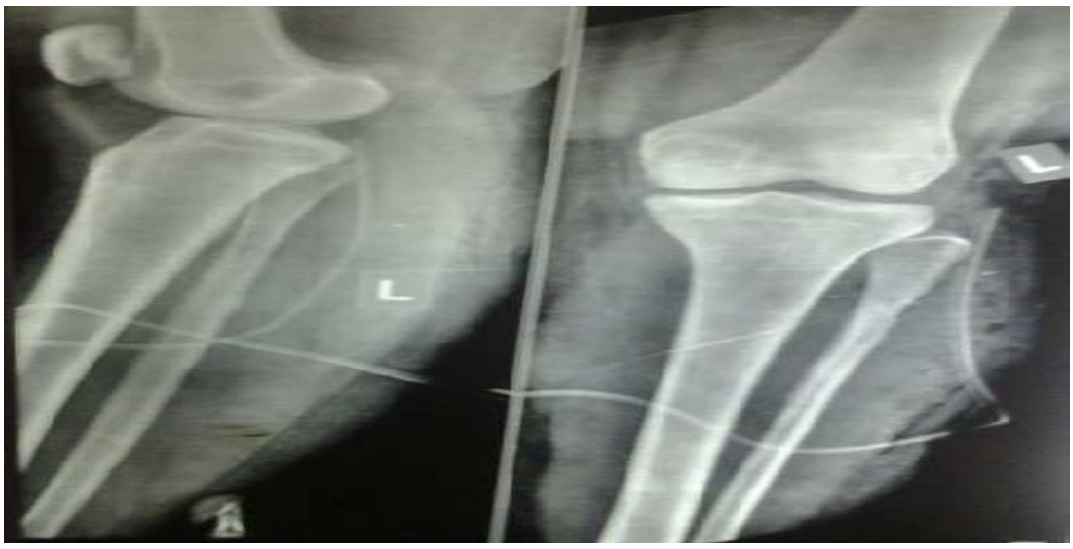

Figure- 5: Anteroposterior and Lateral view of proximal fibula after excision of tumour

Surgical decompression of common peroneal nerve and excision of osteochondroma was planned. Patient placed in supine position with a sandbag placed under left buttock. A tourniquet was applied after exsanguination by elevating hindlimb for 3-5 minutes. A linear incision was taken just posterior to fibula, along the line of biceps femoris tendon and superficial surgical dissection done, common peroneal nerve was isolated. The nerve was mobilized and it was found that osteochondroma was splitting common peroneal nerve midsubstance into two limbs [Figure **2**]. Peroneus longus and Soleus muscle were stripped from fibula and osteochondroma was excised from its base without disturbing its cartilage cap [**Figure 3**]. A single shot of intravenous antibiotics was given pre-operatively and this was continued for three days, along with analgesics and mild steroids (Deflazacort 6 mg) after surgery. A long leg slab was applied with ankle in neutral position, to prevent early muscle contracture and to help in pain management for a week. Histopathological examination of excised tumour confirmed the benign nature of osteochondroma, without any indication of a malignant transformation [Figure **4**]. The patient made full recovery with return of neurological functions at follow up of 6 weeks.

Discussion

Sir Astley Cooper in 1818 first described osteochondroma which is the most common benign developmental tumour of the appendicular skeleton and characterized by an abnormal, ectopic, endochondral ossification around physeal zone. Out of all benign cartilage tumours, osteochondroma account for 34% and 8% of all bone tumours. These growths are comprised of osseous tissue which is surrounded by a cap of cartilage. Although osteochondromas arise spontaneously, it has been estimated that whatever the aetiology being neoplastic or traumatic, patients with solitary osteochondromas typically present with non-tender, slow growing masses. Mass effect seen on adjacent structures such as bone [especially osteochondromas of the forearm and leg], nerves, vessels, muscles, or even in the spinal cord, can also be symptomatic [3].

There were many theories that have proposed to explain the aetiology of osteochondromas; Physeal theory of Virchow, wherein part of plate separates and rotates 90 degrees, Keith's Plate defect theory which was proposed in 1920 and found support in studies by D'Ambrosia and Ferguson in 1968. Authors produced exostoses by transplating physeal cartilage, which verified and supported the concept that exostoses were developmental physeal growth defects [4]. Present consensus about aetiology of osteochondroma is a misdirected growth of a part of the physeal plate. Osteochondromas may be sessile or pedunculated and in 90% of the cases, they are solo in numbers. Tumour is usually covered by a 1-3 mm cap of hyaline cartilage, without cellular atypia. Osteochondromas with progressive enlargement may cause tendon, vessel and nerve compressions or a skeletal deformity [3].

The peroneal nerve is located behind the bony prominence of the fibular neck. It is superficial and covered primarily by subcutaneous tissue and skin [5].

This anatomic course and the increased number of fascicles in this area make the nerve extremely vulnerable to injury. Although injury secondary to a fracture, dislocation, surgical procedure, or application of skeletal traction or a tight cast are the major causes of peroneal palsy, nontraumatic lesions also trigger peroneal nerve neuropathy and include mononeuritis, idiopathic peroneal palsy, intrinsic and extrinsic nerve tumors, extraneural compression by a synovial cyst, ganglion cyst, soft tissue tumor, and osseous mass [6]. Nerve compression caused by osteochondroma is extremely rare, present in <1% of all cases and usually linked to hereditary multiple exostoses syndrome [7]. Moreover osteochondroma growing through midsubstance of common peroneal nerve splitting into two limbs leading to palsy is even more rare event, as discussed in our case. Major percentage of peroneal nerve trauma occurs at the fibular head, where the common peroneal nerve has not yet divided into its deep and superficial branches and where most peroneal nerve lesions, therefore, involve both branches; although motor deficits are more frequently involved than sensory ones. This finding may be explained by the arrangement of the fascicles inside of the common peroneal nerve. The motor fascicles arranged more medially, whereas the sensorial fascicles are located laterally. The exostosis grows from inside to outside, thus compressing the motor fibers earlier, as seen in our case [8].

Conclusion

Osteochondroma is a benign tumor consisting of projecting bone capped by cartilage. These tumors may be solitary or multiple as in hereditary multiple exostoses syndrome. The conjunction of this lesion with peroneal nerve palsy has been exceptionally reported for children and adult, usually linked to hereditary multiple exostoses syndrome. Surgical treatment in such

cases should not be delayed because neurological improvement may be achieved if surgery is performed before severe neurological deficits turns irremediable.

This article reports occurrence of an osteochondroma of the proximal fibula that was noted at surgery to extend through the common peroneal nerve, splitting it into two limbs. By reporting such a rare case, it is our attempt to alert surgeons that this problem may occur, and care should be taken to identify the entire nerve prior to removal of osteochondroma.

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Permission from IRB: Yes

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